Fermi National Accelerator Laboratory

FERMILAB-Conf-95/411

Fermilab-Latin America Collaboration

R. Rubinstein

Fermi National Accelerator Laboratory
P.O. Box 500, Batavia, Illinois 60510

December 1995

Presented at the *Science and Technology for Central America: Plans and Strategies*, Universidad de El Salvador, San Salvador, El Salvador, October 3-6, 1995

Operated by Universities Research Association Inc. under Contract No. DE-AC02-76CHO3000 with the United States Department of Energy

Disclaimer

9 October 1995

Fermilab–Latin America Collaboration

Roy Rubinstein
Fermi National Accelerator Laboratory
Batavia, Illinois 60510
USA

1. Introduction

Fermilab's program of collaboration with Latin America was initiated by then-Director Leon Lederman about 1980. His goal was to aid Latin American physics, and particularly its particle physics; this latter aim is in keeping with the Laboratory's particle physics mission. The reasons for collaboration between institutions in the US and Latin America are many, including geographic and cultural, together with the existence of many talented scientists and many centers of excellence in the region. There are also broader reasons; for example, it has been stated frequently that physics is the basis of much technology, and advanced technology is a necessity for a country's development. There is nothing unique about Fermilab's program; other US institutions can carry out similar activities, and some have carried out individual items in the past. On the Latin American side, such collaboration enables institutions there to carry out forefront physics research, and also to have the advantages of particle physics spin-offs, both in expertise in related technologies and in scientist training. In addition to particle physics, collaboration is possible in many other related areas. Although particle physics is frequently viewed as "big science", all of the large research groups in the field are composed of many small university groups, each of which contributes to the experiment, the analysis and the physics.

Fermilab is an international laboratory, open to all users; a research proposal is accepted on scientific merit and technical competence, not on the country of origin of the scientists making the proposal. Currently, of Fermilab's approximately 1400 users, about 30% are from non-US institutions. It should be noted here that Fermilab's funds, which come from the US government, are for particle physics only; however, there is some flexibility in interpretation of this. The Laboratory is not a funding agency; it is also not a university, so that it cannot award degrees.

2. History

In 1981, Leon Lederman visited Mexico and had discussions on collaboration with physicists from many institutions there. This led in 1982 to the 1st Pan American Symposium on Latin American Collaboration in Experimental Physics, held in Cocoyoc, Mexico; Fermilab was a major organizer of the meeting. Although many fields of physics were covered at this and the

succeeding Symposia, there was some emphasis on particle physics. Shortly after this Symposium, the first Latin American experimental particle physics group was formed, led by the late Clicerio Avilez, then at UNAM, Mexico; this group worked at Brookhaven National Laboratory and then at Fermilab.

A second Pan American Symposium was held in Rio de Janeiro, Brazil, in 1983, and this was followed by the formation in Brazil of two experimental particle physics groups (led by Alberto Santoro and Carlos Escobar), both of which joined experiments at Fermilab. Further Symposia were held in Rio (1987), Bariloche (Argentina, 1989) and Cartagena (Colombia, 1992); over this period experimental particle physics groups were started in Colombia and Argentina.

During the past decade and a half, there have been many visits in both directions between Fermilab and Latin American institutions by physicists and engineers; these visits have helped to strengthen the collaboration. Over the years more Latin American institutions have become active in experimental particle physics (for example, there are now four Mexican institutions involved in experiments at Fermilab). Also, in recent years, there has been increasing contacts within Latin America between the physicists from different countries who are collaborating with Fermilab.

3. Collaborative Activities

Activities carried out over the past years involving collaboration between Fermilab and Latin American institutions are listed below, with brief descriptions. Not all activities are carried out at all times, since they depend on the funding available at the time.

a. Sponsorship of Meetings in Latin America

Fermilab has been a sponsor of several meetings in Latin America; these include, for example, the 5 Symposia mentioned earlier, the Conference on Advanced Computers in Guanajuato, high energy physics schools in Rio de Janeiro, and CHEP95 (Computing in High Energy Physics) also in Rio. Fermilab sends speakers from its staff, and can also help arrange for other US speakers. It has on some occasions obtained funding for the meeting from agencies such as the US National Science Foundation.

b. Fermilab Physicists to Latin America

Visits by Fermilab physicists have taken place to most major Latin American countries, to give seminars and courses, to speak at conferences, and to collaborate with particle physics groups there. There are typically about 10 such visits a year.

c. Theory and Astrophysics

Latin Americans are amongst the visitors to Fermilab's Theoretical Physics and Theoretical Astrophysics groups.

d. CINVESTAV PhD Program

During the 1980's, CINVESTAV (Mexico) was interested in becoming involved in experimental particle physics; they already had an active theoretical particle physics group. Three CINVESTAV graduate students came to Fermilab to work on experiments under Fermilab supervisors. The students wrote theses based on their work, and were awarded CINVESTAV PhD's. Since that time, CINVESTAV has started an active program in experimental particle physics, collaborating on Fermilab experiments.

e. Used Books and Journals

Books and journals no longer needed by Fermilab staff members are collected. Each year lists of the material collected is sent to some 30 Latin American institutions; the institutions send back their requests for material which they would like for library collections, and about 60 boxes of books and journals are sent out.

f. Experimental Particle Physics Groups

Fermilab has been active in helping start particle physics groups in Latin America. This assistance has included the loan of equipment, help with housing costs and some salaries while physicists carry out their research at Fermilab, and sabbaticals at Fermilab. One large project was sending the ACP (Advanced Computer Processor) system to CBPF in Rio de Janeiro so that institution could analyze data there from collaborative experiments. Groups from several institutions in Mexico, Brazil, Colombia and Argentina are currently active in the physics program at Fermilab. Brazil now has about 6 institutions, with of order 100 people now in the field. While initially most activities centered were at Fermilab, there are now significant facilities (data analysis, computers, equipment construction, etc.) in the Brazilian institutions. At least 6 PhD's have been obtained so far. In addition, Brazilian engineers have been active at Fermilab in advanced computing hardware and software.

g. Latin American Engineers at Fermilab

In addition to the Brazilian engineers discussed above, engineers from other Latin American institutions have spent periods of time at Fermilab, gaining experience with state-of-the-art equipment while working on projects that are needed by the Laboratory.

h. Miscellaneous

Fermilab physicists have been on boards and advisory groups for Latin American institutions. The Laboratory's Education Department has supplied

materials and lecturers at a series of conferences on the Teaching of Modern Physics in countries including Mexico, Venezuela and Colombia.

i. Administration of Grants for Latin American Physics

Since 1984, there have been three US government grants totalling $450,000 to aid Latin American physics, obtained by the late Leo Falicov, Leon Lederman and Roy Rubinstein. They were administered without charge by Fermilab. The funds were for scientific visits to US, page charges in US journals, library subscriptions to US journals, and small equipment parts. The goal was to help research physics, predominantly experimental, in Argentina, Brazil, Chile, Mexico and Venezuela; Colombia and Costa Rica were added for the third grant. Representatives (generally associated with the physics societies in each country) selected items needed by that country, and passed the requests to the US administrators. Although the sums of money involved were not large, the amount of goodwill generated seemed to be.

Because of Fermilab's experience with administering the above grants, it has in the past been asked, and agreed, to administer other US government grants for Latin American scientific activities.

4. Conclusions

Because of all the activities described earlier, Fermilab has established relations with many Latin American institutions, predominantly in the field of particle physics, but also in many related fields; many experimental particle physics groups are now active in the region, unlike the situation in 1980. The Laboratory has benefitted, for example, by having talented Latin American engineers and physicists work at Fermilab. There has been much positive feedback on the program from scientists and administrators in both the US and Latin America. One important aspect of the collaboration has been its informality; there has been little government involvement and almost no written agreements.

As noted earlier, all of the collaborative activities carried out by Fermilab and Latin American institutions can be carried out by other US institutions, and it could be that Fermilab's program can serve as a model for others to follow and improve.